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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/039,438	03/16/98	SHIN W	041992-5037

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IM22/0829

EXAMINER  
POWELL, A

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 08/29/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.  
09/039,438

Applicant(s)  
Shin, et al

Examiner  
Powell, A.

Group Art Unit  
1763



☒ Responsive to communication(s) filed on 8/7/00

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire three month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claims

☒ Claim(s) 1-20 is/are pending in the application.

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 1-20 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☒ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been

☒ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☐ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 19

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

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## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson (U.S. Pat. No. 4,147,581) in view of Chung et al (U.S. Pat. No. 5,00,795)

Nelson discloses an etching process and apparatus for chemically etching material from a substrate (col. 1, lines 9-11). An etched product is covered with an aqueous liquid (first etchant) and the resulting liquid (residual etchant) is passed through an ion exchanger to remove the ions from the rinse liquid which is reused or discharged. (Abstract). The solids (residue materials) are removed from an etcher (a first tank) (2) via a stream (1) which passes into a rinse chamber (a second tank) (4). (Fig. 1; col. 4, lines 49-68). The rinse liquid stream (5) then goes through an ion exchanger means (11). A replenishing solution from the ion exchange means is combined with the stream of a bulk storage tank (20) to form a combined stream (connecting passage) (31) going to the etcher (2). (col. 5, lines 35-55) The bulk storage tank (20) has streams flowing to the etcher (2) for etching the product and to the ion exchange means (11) in order to regenerate the resin. Stream (12) from the ion exchanger (11) moves to a discharge stream (16), which passes to a sewer. (Col. 5, lines 5-10). The etcher (2) can be a spray etcher which would

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inherently have nozzles (col. 4, line 40). Etchable material reads on a glass substrate ( col. 4, line 38) .

Nelson does not disclose expressly an immersion of a substrate in an etched bath or a bubble plate.

Chung et al disclose a bubble plate (17) located on the floor of a tank (10). (Fig. 1) The bubble plate (17) transmits inert gas to create a bubbling condition within the tank (10) for sufficient agitation (col. 1, lines 60-68). Substrates (14) are immersed in an etch bath (13) (Fig. 2; col. 2, lines 35-38)

At the time of the invention it would have been obvious to a person of ordinary skill in the art to replace the spray etcher of Nelson with the etch bath and bubble plate of Chung et al.

The motivation for doing so would have been to etch substrates by spraying etchant onto substrates to immerse the substrates in said etchant within a tank while agitating the etchant with inert gas transmitted through a bubble plate in order to promote reaction and remove from the substrates' surfaces reacted impurities as taught by Chung et al. (Col. 2, lines 45-52)

Therefore, it would have been obvious to combine Nelson with Chung et al to obtain the invention in claims 1 and 19-20.

3. Claims 2, 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson (U.S. Pat. No. 4,147,581) in view of Chung et al (U.S. Pat. No. 5,00,795) as applied to claims 1 and 19-20 above, and further in view of Tittle (U.S. Pat. No. 4,886,590).

Nelson and Chung et al are discussed above.

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Nelson and Chung et al do not disclose expressly a temperature sensor.

Tittle et al disclose a process control system having a plurality of sensors for sensing various parameters. One of the parameters for controlling the process may include temperature (abstract; col. 3, lines 65-68; col. 4, line 64- col. 5, line 10). A formula may be used to compute bath effectiveness based on the parameters detected. Any variation of the effectiveness triggers a responsive change. A response change can be the termination of the etch process.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to control the etching operation for the etching apparatus of Nelson with the chemical processing control system of Tittle et al.

The motivation for doing so would have been to monitor, initiate corrective action and establish limits for the etching operation as taught by Tittle et al (claim 8).

Therefore, it would have been obvious to a person of ordinary skill in the art to combine Nelson with Chung et al and Tittle et al to obtain the invention as specified in claims 2, 7 and 10.

4. Claims 3-6, 8-9 and 11-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson (U.S. Pat. No. 4,147,581) in view of Chung et al (U.S. Pat. No. 5,00,795) as applied to claims 1 and 19-20 above, and further in view of Jones et al (U.S. Pat. No. 3,869,313) and Tittle (U.S. Pat. No. 4,886,590).

Nelson and Chung et al are discussed above.

Nelson and Chung et al do not disclose expressly a rinse and drying bath for the substrate, a temperature sensor, a concentration measuring device and a HF etching solution.

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As to claims 3-5, 8- 9, 11-12 and 18, Jones et al disclose a chemical processing apparatus containing a plurality of treatment chambers having a dip chamber with filling pumps, a spray chamber which serves as a rinse chamber or a drying chamber (col. 2, lines 20-39 and 63-68; col. 3, lines 1-10). The rinse chamber would be filled with deionized water from a deionized reservoir (col. 2, lines 52-55). An essential part of the apparatus is a conveyor means for automatically transferring the workpieces from treatment chamber to treatment chamber. (Fig. 1; Col. 3, lines 50-55) The conveyor allows for a plurality of substrates to be processed substantially at the same time. Using a pump to move fluid from one chamber to another is conventional.

As to claims 6 and 17, Jones et al disclose a cleaning/etching solution containing hydrofluoric acid (col. 5, lines 49-60; col. 6, lines 33-35 and 51-54). Jones et al disclose cone-shaped bottom tanks (Figs. 6A-B).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to combine the multiple chambers for rinsing and drying of Jones et al with the etching apparatus of Nelson.

The motivation for doing so would have been to provide treating operations such as rinsing and drying of substrates as taught by Jones et al.

Nelson and Jones et al do not disclose expressly a temperature sensor or a concentration measuring.

As to claims 13-16, Tittle et al is discussed above.

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At the time of the invention it would have been obvious to a person of ordinary skill in the art to control the etching operation for the etching apparatus of Nelson and Jones et al with the chemical processing control system of Tittle et al.

The motivation for doing so would have been to monitor, initiate corrective action and establish limits as taught by Tittle et al (claim 8).

Therefore, it would have been obvious to a person of ordinary skill in the art to combine Nelson with Chung et al, Jones et al and Tittle to obtain the invention as specified in claims 3-6, 8-9 and 11-18.

*Response to Amendment*

5. Applicant's arguments filed 8/7/00 have been fully considered but they are not persuasive.

As to the arguments pertaining to the glass substrate, Nelson discloses etchable material which reads on a glass substrate. The material worked upon does not limit apparatus claims. See MPEP 2115

6. As to the argument concerning the etching of the substrate itself, the removal of material from the surface of a substrate will ultimately thin the substrate itself. The amount of material removed from the substrate itself is dependent on the length of time the substrate remains in the etchant. Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. See MPEP 2114

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7. As to arguments concerning immersion of the substrates, Chung et al is now applied to claims 1-20.

*Conclusion*

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Molinaro (U.S. Pat. No. 5,082,518) discloses a gas diffusion system for evenly distributing injected gas in a bath including a diffusion sparger plate (Fig. 2; abstract).

G.B. 829605 discloses a method of regenerating a glass etching bath. (Pg. 2, lines 50-58; pg. 3, lines 15-58)


9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alva C. Powell whose telephone number is (703) 305-0541.

The fax phone number for the organization where this application or proceeding is assigned is (703) 305-5408.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

  
Alva C. Powell

8/22/00

  
GREGORY MILLS  
PRIMARY EXAMINER